

### THE ACIDITIES WITHIN THE ALIMENTARY TRACTS OF INSECTS.

Of late entomologists and zoologists are giving increasing attention to the acidities and alkalinities within the alimentary tracts of insects in view of the possible bearing of such conditions on the solubilities of poisons, development of intestinal parasites, etc. Such acidities and also alkalinities are expressed as hydrogen ion (pH) concentrations by readings of a scale in which pH 7 is considered as the neutral point; the lower the figure, the greater the acidity. The hydrogen ion concentration may be determined by an electrical method or by means of colorimetric comparisons with a set of colored standard solutions whose pH values are known.

To mention only two recent papers on this subject, Dr. W. J. Crozier, writing in the "Journal of General Physiology" (vol. VI, No. 3, pp. 289-293), finds that in the larvæ of *Psychoda* and *Chironomus* (Diptera) "The ingested food is subjected first to a faintly alkaline salivary juice, passes then through a distinctly acid cardiac chamber, thence to a no less distinctly alkaline portion of the gut" (mesenteron) wherein the food passes most slowly and absorption is most active. He states that in the larvæ studied the hindgut is probably of minor importance in digestion and absorption and that its acidity is due to the discharge from the malphigian tubules. Dr. Crozier gives the typical hydrogen ion concentrations within the regions of the digestive tract as follows: œsophagus 7.1; cardiac chamber 6.2; mesenteron (stomach) 7.5; hindgut 6.4.

Mr. Harrison M. Tietz in the "Journal of Economic Entomology" (vol. 17, No. 4, pp. 471-477) reports that the hydrogen ion concentrations in the alimentary tract of the honeybee are as follows: œsophagus 7.0 (?); stomach plus the honey stomach 5.6 and intestine 7.4. He also found that the solubility of arsenate of lead "does not seem to increase when the powder is acted upon by the fluids in the œsophagus" and that the secretions of the honey stomach and stomach render the arsenate of lead at least one and one-quarter times as soluble and the action of the intestinal juices, at least three and three-quarters times as soluble as it would be in water alone.

Ed.